United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

RESTORATION OF RARE OR DECLINING NATURAL COMMUNITIES

CODE 643

(ac)

DEFINITION

Re-establishment of abiotic (physical and chemical) and biotic (biological) conditions necessary to support rare or declining natural assemblages of native plants and animals.

PURPOSE

This practice is applied to—

- Restore the physical conditions and/or unique plant community on sites that partially support, or once supported, a rare or declining natural community.

Application of this practice addresses resource concerns of degraded plant condition and/or inadequate wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

Applied on all lands, including degraded aquatic, terrestrial, or wetland sites, that historically supported a functional rare or declining (dwindling or imperiled) native plant or animal community, where restoration is needed to achieve identified abiotic and biotic target conditions. This practice can also be applied to efforts to restore natural communities of local cultural importance.

This practice does not apply where it is possible to meet target conditions solely through implementation of annual management actions such as prescribed burning, prescribed grazing, forest stand improvement, or pest management.

CRITERIA

General Criteria Applicable to All Purposes

Conduct a site assessment to determine baseline abiotic (nonliving, physical, and/or chemical components of the site) and biotic conditions (living characteristic, including native plants, wildlife, insects, and other organisms important to reaching the target conditions), and to identify restoration objectives for the abiotic and biotic target conditions.

Use reference sites, ecological site descriptions, or other appropriate references to determine appropriate target conditions and degree of restoration required.

Identify (i) the natural disturbance regime(s) that created the target conditions, and (ii) the ecological processes necessary to maintain such conditions.

Identify invasive and exotic species that many have contributed to the degraded conditions, and that may challenge restoration efforts.

When restoring abiotic conditions, the following criteria apply:

• Restore macro and/or microtopography where required to support natural communities. Microtopography features are elevational changes at the individual plant scale, often removed by normal agricultural practices (i.e., plowing, subsoiling, and mowing), overgrazing by livestock and feral ungulates, and the resulting sheet and rill erosion. Macrotopography features are elevational changes large enough to affect the plant community in a portion of the area that creates clumped vegetative mosaics, and are too large to remove with typical cultivation activities.

• Restore inherent and often diverse soil textures and/or chemistry (i.e. fertility, pH, and salinity) that supported the target natural community in terms of natural vegetative pattern, structure, richness and diversity, prior to alteration through mixing, cultivation, irrigation, and/or land clearing.

• Restore the substrate (i.e., oyster shell beds, course woody debris, and rock outcrops) where required to support natural communities.

• Restore hydrology where necessary to support plant or animal communities.

• Restore other degraded abiotic conditions where required to support natural communities.

• Borrow material used in the restoration effort, will be free of noxious and/or invasive species.

• When restoration involves use of heavy equipment (tractors, dozers, etc.) for excavation, building of dikes or berms, installation of rock or wood structural elements, geomorphic modification, or redirection of flow regimes, use the appropriate engineering practice or practices. Associated NRCS engineering practices may include: Dike (356), Diversion (362), Pond (378), Grade Stabilization Structure (410), Streambank and Shoreline Protection (580), Open Channel (582), Channel Bed Stabilization (584), Structure for Water Control (587).

When restoring a vegetative community, the following criteria apply:

• Reconstruct biotic target conditions within the practice life span.

• Remove or control undesirable plant species that may jeopardize meeting success criteria.

• Use source-identified local ecotypes, when available.

• Establish vegetation in a manner that reflects the natural pattern (random or clumped mosaic, or uniform distribution) based on topography, slope, aspect, soils, and moisture gradients.

• Apply appropriate protocols for vegetative establishment (planting dates, planting methods, cold storage, plant material care, germination rates, post-planting management, etc.) to ensure an acceptable rate of survival of planted materials.

CONSIDERATIONS

Consider that land use and habitat in the surrounding landscape may influence the ability to achieve restoration and management objectives.

Engage interdisciplinary expertise (e.g., engineers, hydrologists) early in the planning process to consider relevant watershed factors, geomorphic setting, and risks to infrastructure or property when determining appropriateness of planned restoration activities.

Engage cultural experts and leaders acquainted with the cultural importance local fauna, flora, and customs in the planning process.

Implement Integrated Pest Management practices to mitigate for potential on-site and off-site impacts.

Identify and conserve adjacent habitat to sustain disturbance-intolerant wildlife during the restoration activities. In the absence of such refugia, stage restoration over time to provide such habitat.

Soil mycorrhiza can have a significant impact on the establishment and pattern success of restoration efforts of native plant communities. Consider existing mycorrhiza populations and the use of inoculation to mitigation for deficiencies.

Residual pesticides and excessive soil fertility can reduce restoration success. Consider the use of a nurse crop to reduce pesticide and fertility levels.

Maintain the integrity of the local genotype by using local plant materials (e.g., use of local seedbank, harvest of plant materials from local native areas) and/or using strict quality control standards when using commercial plant materials.

Reintroduce, establish or manage native biota (e.g., beaver, prairie dogs, oysters, and tussock sedges) to assist in the restoration and/or maintenance of the target conditions.

Avoid implementing restoration and/or maintenance activities during critical life stages of sensitive fish and wildlife, except when necessary to achieve the desired habitat condition, including desired disturbance regimes.

Conserving, restoring, or managing rare or declining natural communities may be accomplished by using supportive or facilitative conservation practices. Determining the practices and management will depend upon the site potential and the habitat goals (desired future condition).

Generally, the size of the restored or managed area should be large enough to support and maintain populations of all species associated with the targeted habitat.

Consider the effects on unique or rare flora.

Soil disturbance associated with the installation of this practice may increase the potential of invasion or spread of invasive plant species. Use mitigation techniques to prevent or reduce any negative effects.

Consider the accessibility of the site for installation, management, and maintenance.

When selecting plants and designing management for this practice, consider the needs of pollinators and incorporate to the maximum extent practicable.

Consider the likelihood of being able to maintain important ecological disturbances such as burning, flooding or grazing long-term.

PLANS AND SPECIFICATIONS

Site specific planning for this practice shall follow the Standards and Specifications, and be recorded using the appropriate, approved implementation requirement (s). Narrative statements in the conservation plan or other documentation may provide supplemental information.

Specifications for this practice shall include:

• Documentation of baseline conditions (abiotic and biotic).

• Identify the eco-system type and wildlife species or guild.

• Description of the target abiotic (e.g., soils/substrate, hydrology, macro and micro topography, aspect) and biotic (e.g., species composition, age, structure) conditions.

• List of each restoration activity, including activities that are supporting conservation practices (e.g., burn, restore historic microtopography, fertilize, seed bed preparation, and planting) with a date range for implementation/application of each activity.

• Facilitating practices (prescribed burning, forest stand improvement, etc.) necessary for restoration, including the anticipated timing, extent, intensity, and frequency of each disturbance/management activity identified as needed to create the target conditions.

• Activities needed to control noxious, invasive, undesirable, and/or competing plant or animal species to restore the site to the target conditions.

• Description of the criteria being used to determine when restoration has been successful.

OPERATION AND MAINTENANCE

The Operation and Maintenance (O&M) plan shall:

• List activities required to maintain the restored conditions in the O&M plan.

• Annually inspect and repair structural or vegetative components of this practice.

• Habitat conditions shall be evaluated and compared to desired conditions on a regular basis; to be able to quickly adjust the conservation plan and ensure the desired habitat conditions are met. Specify the appropriate timing in the Operation & Maintenance schedule.

• Include a post-restoration schedule that provides for the identification of adaptive management efforts as necessary. Include an assessment of the potential for reinvasion by noxious, invasive, and problem species from nearby lands and waters in the assessment.

• Any adjustments to treatments and/or management must be made in consultation with the local NRCS conservationist.

REFERENCES

- Barbour, M.G., and W. D. Billings (eds.). 2000. North American Terrestrial Vegetation. Cambridge University Press, New York, Second Edition.
- Chambers, J.C., Miller, J.R. Germanoski, D., Weixelman, D.A. 2004. Process based approaches for managing and restoring riparian ecosystems. In: Chambers, J.C.; Miller, J.R., eds. Great Basin Riparian Ecosystems—Ecology, Management and Restoration. Covelo, CA: Island Press: 261-292.
- Dickard, M., M. Gonzalez, W. Elmore, S. Leonard, D. Smith, S. Smith, J. Staats, P. Summers, D. Weixelman, S. Wyman. 2015. Riparian area management: Proper functioning condition assessment for lotic areas. Technical Reference 1737-15. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.
- Lichvar, R. W., N. C. Melvin, M. L. Butterwick, and W. N. Kirchner. 2012. National wetland plant list indicator rating definitions. US Army Corps of Engineers, Engineer Research and Development Center/Cold Regions Research and Engineering Laboratory, ERDC/CRREL TN-12-1.
- Maestas, J.D.. S. Conner, B. Zeedyk, B. Neely, R. Rondeau, N. Seward, T. Chapman, L. With and R. Murph. 2019. Hand-built structures for restoring meadows in sagebrush rangelands; Examples and lessons learned from the Upper Gunnison River Basin, Colorado. Range Technical Note No. 40.USDA NRCS, Denver, CO.
- Kuchler, A.W. 1964 Potential Natural Vegetation of the Conterminous United States. American Geography Society, Special Publication 36. Second edition (revised), 1975.
- New Mexico Department of Game and Fish. 2016. State Wildlife Action Plan for New Mexico. New Mexico Department of Game and Fish, Santa Fe, New Mexico, USA.
- New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page. http://nmrareplants.unm.edu
- Noss, R.F., E.T. LaRoe III, and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. Biological Report 28; National Biological Service, Washington, D.C.

- Rondeau, R.J., G. Austin, and S. Parker. (In prep) Restoring wet meadows: vegetation monitoring results 2012-2017.
- Rosgen, D.L. 1996. Applied River Morphology. Pagosa Springs, CO: Wildland Hydrology, Inc. 390 p.
- Schumm, S.A.; Watson, C.; Harvey, M. 1984. Incised channels: morphology, dynamics and control. Littleton, CO: Water Resources Publications.
- Silverman, N.L., B.W. Allred, J.P. Donnelly, T.B. Chapman, J.D. Maestas, J.M. Wheaton, J. White, and D.E. Naugle. In Press. Low-tech riparian and wet meadow restoration increases vegetation productivity and resilience across semi-arid rangelands. Restoration Ecology.
- Sponholtz, C. and A. C. Anderson. 2013. Erosion Control Field Guide. Quivira Coalition and Watershed Artisans.
- Swanson, S. S. Wyman, and C. Evans. 2015. Practical Grazing Management to Maintain or Restore Riparian Functions and Values on Rangelands. Journal of Rangeland Applications 2:1-28. The Nature Conservancy (TNC). 2017. Gunnison Basin Wet Meadow and Riparian Restoration and Resilience-Building Project. Executive Summary. www.bit.ly/2pI3riy
- The Nature Conservancy and the Gunnison Climate Working Group (TNC and GCWG). 2017. Restoration and Resilience-Building of Riparian and Wet Meadow Habitats in the Upper Gunnison River Basin, Colorado. Annual Performance/Progress Report (Project #L14AC00115) for Bureau of Land Management. www.bit.ly/2GwrAlQ
- USDA. Plants Database. www://plants.usda.gov
- USDA, NRCS, Wildlife Habitat Management Institute. 2006. Importance of Disturbance inHabitat Management. Fish and Wildlife Habitat Management Leaflet No. 37. Technical Note 190-52
- USDA, NRCS, Wildlife Habitat Management Institute. 2002. Integrated Pest Management(IPM) and Wildlife. Fish and Wildlife Habitat Management Leaflet No. 24. Technical Note 190-27.
- Wheaton JM, Fryirs K, Brierley G, Bangan S, Bouwes N, O'Brien G. 2015. Geomorphic mapping and taxonomy of fluvial landforms. Geomorphology 248: 273–295.
- Zeedyk, B. 2006. Harvesting water from Low-Standard Rural Roads. A Joint Publication of the Quivira Coalition, Zeedyk Ecological Consulting, LLC, The Rio Puerco Management Committee – Watershed Initiative, and the New Mexico Environment Department – Surface Water Quality Bureau.
- Zeedyk, B. and J. W. Jansens. 2009. An introduction to erosion control. 3rd edition. Joint publication from Earth Works Institute, The Quivira Coalition, and Zeedyk Ecological Consulting.
- Zeedyk, B and V. Clothier. 2014. Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels. 2nd edition. Chelsea Green Publishing.
- Zeedyk, B., M. Walton, and T. Gadzia. 2014. Characterization and Restoration of Slope Wetlands in New Mexico: A Guide for Understanding Slope Wetlands, Causes of Degradation and Treatment Options. NM Environment Dept., Santa Fe, NM.
- Zeedyk, B. 2015. The Plug and Spread Treatment: Achieving Erosion Control, Soil Health and Biological Diversity. Sapello, NM: Zeedyk Ecological Consulting, LLC.
- Zeedyk, W.D. and S. Vrooman. 2017. The Plug and Pond Treatment: Restoring Sheetflow to High Elevation Slope Wetlands in New Mexico. New Mexico Environment Department, Surface Water Quality Bureau Wetlands Program (NMED-SWQB).

NRCS, NM
July 2020